

**Application for Construction Permit
Heartland Family Farms, LLC
Larue County, Kentucky**

Submitted to:

Surface Water Permits Branch
Division of Water
Department for Environmental Protection
200 Fair Oaks, 4th Floor
Frankfort, KY 40601

Submitted by:

Eric Sweazy & Ryan Bivens
Heartland Family Farms, LLC
4109 Sonora Road
Hodgenville, KY 42748

Submitted on:

September 11, 2009

Prepared by:

EarthWise, Inc.
63 S. Franklin Street, Suite B
Valparaiso, IN 46383



EarthWise, Inc.

Environmental Technologies that Work

EarthWise, Inc.
63 S. Franklin, Suite B
Valparaiso, Indiana 46383
219.531.0266
219.531.2576 fax

September 11, 2009

Mr. Ronnie Thompson
Surface Water Permits Branch
Energy and Environment Cabinet
Division of Water
Department for Environmental Protection
200 Fair Oaks, 4th Floor
Frankfort, KY 40601

Subject: Heartland Family Farms, LLC – Application for a construction permit

Dear Mr. Thompson:

Enclosed please find an application for a construction permit at Heartland Family Farms near Hodgenville in Larue County. The application for the operating permit will be sent under separate cover.

The facility will have at least 180 days of manure storage capacity, and is designed to collect process storm water separately from clean storm water. The facility will contain the following structures:

- 1 freestall barns
- 1 earthen waste storage pond
- 1 concrete flush water recycling pit
- 1 concrete flush flume reception pit
- 1 manure digester with covered dried solids storage area
- 1 concrete silage pad

The total number of animals to be confined will be up to 4,000 dairy cows.

Please call me or Scott Harmon (of EarthWise) at your convenience if you have any questions or need additional information. Thank you for your consideration.

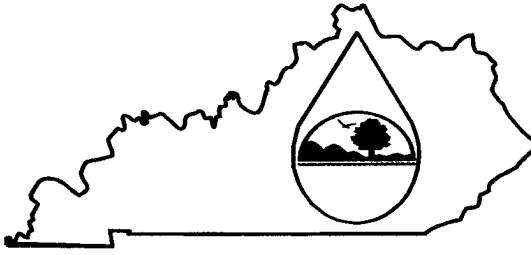
Sincerely,
EarthWise, Inc.

Scott D. Severson
President

Enclosures: Application for construction permit

SHORT FORM B

AZ# 105551

	<p>Kentucky No Discharge</p> <p>Operational Permit Application</p> <p>for Agricultural Wastes</p> <p>Handling System</p>
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <p style="font-size: 1.5em; margin: 0;">RECEIVED</p> <p style="margin: 0;">SEP 15 2009</p> <p style="margin: 0;">By _____</p> </div>	

For additional information, contact KPDES Branch, (502) 564-3410.

This is an application to:

1. Apply for a new operational permit
2. Apply for reissuance of expiring operational permit
3. Apply for a construction permit
(Attach design criteria)

(3 one)

☐

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KNDOP NUMBER (AGENCY USE ONLY)		123105551					
I. GENERAL INFORMATION							
Applicant Name:	Ryan Bivens - Owner; Heartland Family Farms, LLC						
Mailing Address:	4109 Sonora Road						
City, State, Zip Code:	Hodgenville, KY 42748						
Telephone No. + Area Code:	(270) 268-1413						
II. FACILITY DESCRIPTION (Location)							
Facility Name	Heartland Family Farms						
Standard Industrial Classification (SIC) Code and Description: (Please check one)							
<input checked="" type="checkbox"/> 0241 - Dairy Farm <input type="checkbox"/> 0213 - Hog Farm <input type="checkbox"/> 0212 - Beef Farm <input type="checkbox"/> 0251 ,0252 - Poultry Farm <input type="checkbox"/> 0291 - Other							
Location Address	3006 Munfordville Road						
City, State Zip Code	Sonora, KY 42776						
County where facility is located:	Larue						
Attach a US Geological Survey 7 1/2 minute quadrangle map for the site with the facility clearly marked. USGS maps may be obtained from the Economic Development Cabinet, Map Sales Office, 133 Holmes Street, Frankfort, KY 40601. Phone (502) 564-4715.							
Facility Latitude (d/m/s)	37 deg. 30' 3"			Facility Longitude (d/m/s)	-85 deg. 47' 2"		

III. SOURCE AND DESTINATION OF WASTES

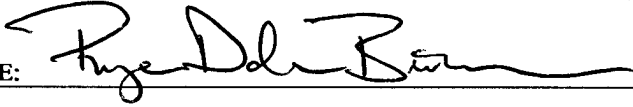
Indicate the number of animals the facility is currently supporting or has been planned to support in the Table below.

Type of Animals (include approximate live weight per animal)	Number of Animals
Dairy Cows - approximately 1,400 lbs	4,000
Total:	4,000

Current or planned method of waste storage: (Holding Pond, Holding Tank, Stack Pad, etc.)	Holding Pond, Digester Holding Tank
Approximate number of acres available for land application of wastes:	2,000 +
Comments: Dairy cows will be housed under roof, manure digester will be utilized prior to final storage and land application.	

IV. Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

PRINTED OR TYPED NAME OF Person Signing	Ryan Bivens; Heartland Family Farms, LLC
TITLE	Owner
DATE SIGNED	9-12-09
SIGNATURE:	

Return completed application form and attachments to: KPDES Branch, Division of Water, Frankfort Office Park, 14 Reilly RD, Frankfort, KY 40601. Questions should be directed to: KPDES Branch at (502) 564-3410.

The Natural Resources and Environmental Protection Cabinet does not discriminate on the basis of race, color, national origin, sex, age, religion, or disability and provides, upon request, reasonable accommodations including auxiliary aids and services necessary to afford an individual with a disability an equal opportunity to participate in all services, programs, and activities. For an alternate form of this application, contact the KPDES Branch, Division of Water.

Design Criteria

- **Manure Production Calculations**
- **Manure Storage Calculations**
- **Soil Boring Report**
- **Facility Farmstead**
- **Construction Plans (attached)**

Heartland Family Farms
Manure Production and Storage Calculations

Manure Production -- Wet and Dry Cow Free Stall Barn (180 Day Minimum)

Dry Components

Cow Herd Factors		Manure *	Bedding	Daily Total	Yearly Production		Animal Capacity	Acres
	#	(ft ³ /day/animal)	(ft ³ /day/animal)	(ft ³ /day)	(ft ³ /year)	(yd ³ /year)	Animal/Acre/Year	Required
Milking Cows	3,200	2.50	0.00	8,000	2,920,000	108,148	2	1,600
Dry Cows	800	1.15	0.00	920	335,800	12,437	2	400
	0	0.00	0.00	0	0	0	0	0
Total	4,000			8,920	3,255,800	120,585	Total Acres	2,000

* As excreted from MWPS-18 Section 1 (Table 6)

Parlor Water Use

Cow Herd Factors		Water Use **	Daily Total	Yearly Production	
	#	(ft ³ /day/animal)	(ft ³ /day)	(ft ³ /year)	(yd ³ /year)
Milking Cows	3,200	2.0	6,400	2,336,000	86,519
Dry Cows	800	0.0	0	0	0
	0	0.0	0	0	0
Total	4,000		6,400	2,336,000	86,519

** Includes miscellaneous water captured in waste handling system.

	Manure Volume		Parlor Water		Total ***
	days	ft ³	days	ft ³	ft ³
Milking Cows	180	1,440,000	180	1,152,000	
Dry Cows	180	165,600	180	0	
	180	0	180	0	
Sub Tot.		1,605,600	Sub Tot.	1,152,000	2,757,600

*** Total system manure production: 3.83 ft³/day/animal

Heartland Family Farms
Manure Production and Storage Calculations

Available Storage (180 Day Minimum)

Stormwater Runoff				
Runoff Accumulation Location	ft ²	180 days Runoff* (in)	25 yr/24 hr storm Runoff** (in)	ft ³
Chamber 2	81543	27.02	6	224,379
Chamber 3	362884	27.02	6	998,536
Runoff from Silage Pad	219375	15.3	5.7	383,906
Silage Retention Pond	51200	27.02	6	140,885
Circular Flush Pit	707	27.02	6	1,945
Flush Flume Reception Pit	3885	27.02	6	10,690
Evaporation** from Chamber 2	47808	na	na	-33,466
Evaporation** from Chamber 3	232426	na	na	-162,698
Total Runoff Contributions				1,564,178

Manure Storage Capacity		
Component	Dimensions (ft X ft X ft)	ft ³
Chamber 2	231' X 353' X 13'	674,315
Chamber 3	353' X 1028' X 20.5'	5,359,715
Sludge Accumulation in Chamber 2	516' X 280' X	-48,951
Sludge Accumulation in Chamber 3	150' X 150' X 150'	-235,377
Total Storage Capacity (storage capacity = volume - 2 feet freeboard)		
		5,749,702

* Precipitation for 6 most critical months (Dec.-May) from TAPS Station Hodgenville-Lincoln NP, KY 1971-2000: 27.02"
Runoff from concrete lot for 6 most critical months (Dec.-May) using Part 651 Agricultural Waste Management Field Handbook: 15.3"
Precipitation for 25 Year 24 Hour Storm from Midwest Climate Center - Rainfall Frequency Atlas of the Midwest (figure 6): 6"
Runoff from concrete surface from 25 Year 24 Hour Storm from TR55: 5.7"

** Evaporation from Climate Atlas of the US, 1968 Dept. of Commerce.
Mean annual lake evaporation of 35". Mean December - May evaporation from Part 651 Agricultural Waste Management Field Handbook: 8.4"

Manure Storage Requirements - 180 days			
Component			ft ³
Manure - Cows (including bedding***)			1,605,600
Parlor Water	48,000 gal/day		1,152,000
Stormwater Runoff			1,564,178
Silage Juice (0.5 ft ³ /ton)	20,000 ft ³ /yr		20,000
Total Storage Requirements			4,341,778

Summary:		
Component		ft ³
Manure Storage Capacity		5,749,702
Manure Storage Requirements		-4,341,778
		0
		0
Excess Storage		1,407,924

*** Bedding will consist of recycled post digestion manure solids from the facility.

GEOTECHNICAL ENGINEERING STUDY

**HEARTLAND DAIRY FARM
STATE ROUTE 357
TANNER, KENTUCKY**

ASHER PROJECT NO. 009-100

Prepared For:

**Mr. Larry Phillips
Phillips Brothers Construction, LLC
120 Insanity Lane
Vine Grove, Kentucky 40175**

Prepared By:

**Asher, Inc.
1021 S. Floyd Street
Louisville, Kentucky 40203**

July 31, 2009

ASHER, INC.

Environmental & Engineering Consulting

July 31, 2009

Mr. Larry Phillips
Phillips Brothers Construction, LLC
120 Insanity Lane
Vine Grove, Kentucky 40175

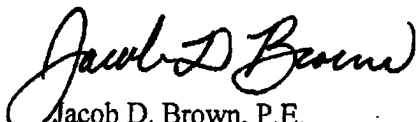
RE: Geotechnical Engineering Study
Heartland Dairy Farm
State Route 357
Tanner, Kentucky (Larue County)

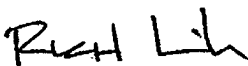
Dear Mr. Phillips,

Asher, Inc. has completed a Geotechnical Engineering Study for the above referenced project. This report contains the findings of our subsurface exploration, geotechnical recommendations to aid design of foundations, floor slabs, and pavements, and construction recommendations with regard to site work; fill placement, and foundation installation and inspection.

We appreciate the opportunity to be of service to you on this project. If we can be of further assistance, or if you have any questions regarding this report, please contact our office.

Sincerely,


Jacob D. Brown, P.E.
Project Engineer



Richard A. Linker, P. E.
President

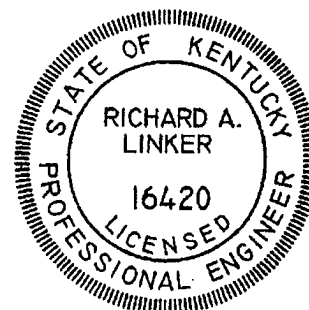


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1.0 PROJECT INFORMATION

The project site is located on the east side of State Route 357 approximately 5 miles southwest of Hodgenville, Kentucky. The subject property is rolling with the majority of the ground surface being used for agriculture (soybeans, tobacco, and wheat). Several structures are located on the subject property including a single family home, barns, and support buildings. A small pond is located on the southwest portion of the site.

Proposed for construction is Dairy Facility consisting of the following; a one-story approx. 447,260 sq. ft. Freestall Barn, Holding Barn and Milking Parlor, Covered Manure Storage, Digester, Electric Room, Dryer/Separator, Shop Building, Covered Hay Building, Commodity Storage, Hay Building, Silage Pad, Silage Water Retention Pond, 5,000,000 gallon Manure Water Storage Pond with 2 ft. Freeboard (Lagoon Chamber 2), and 30,000,000 gallon Manure Water Storage Pond with 2 ft. Freeboard (Lagoon Chamber 3). An entrance road will be provided from Highway 357 on the west-central portion of the site. Crushed stone and paved access roads would be provided.

2.0 SUBSURFACE EXPLORATION

The subsurface conditions were explored by conducting 5 test pits. Four (4) located in the proposed lagoon areas, and one (1) located in the deep cut area on the northeast portion of the proposed Freestall Barn footprint. The test pits were located by pacing distances from existing landmarks in the field and should be considered approximate. The locations of the test pits are shown on the plan included in the Appendix. The test pit logs (included in the Appendix) describe the materials and conditions encountered at each location.

About 12 to 18 in. of topsoil/till zone was encountered in our test pits as measured from the ground surface. Thicker topsoil zones (18 to 24 in.) were located on the northern-half of Lagoon Chamber 3.

2.0 Subsurface Exploration (cont.)

Below the surficial topsoil layer our test pits typically encountered gray and orangish brown silty lean clay in the lagoon areas. The silty lean clay was firm and moist.

In TP-5 in the proposed deep cut area, our test pit encountered about 12 in. of topsoil underlain by reddish brown lean clay to the termination depth of 12 ft. below the existing ground surface.

3.0 DESIGN RECOMMENDATIONS

The following design recommendations have been developed on the basis of the previously described project characteristics and subsurface conditions. Please notify our office if the project description included herein is incorrect. Asher would then review the new project description to determine if revisions to our recommendations are necessary.

3.1 Site Development

Topsoil depths of at least 12 in. were encountered in our test pits with thicker topsoil depths being observed on the northern-half of the proposed lagoon areas. The topsoil should be stripped from all proposed building footprint areas, including at least 5 ft. outside of the proposed footprint areas. A proofroll of the exposed subgrade upon completion of removing the topsoil should be performed using a fully-loaded truck or scraper to confirm a firm subgrade.

3.2 Embankment Construction

The proposed lagoon embankments should be constructed from the reddish brown lean clay soils obtained in the deep cut areas around the site. At least 24 in. of reddish brown lean clay should line the bottoms of the lagoons. The permeability of the reddish brown lean clay soils is less than 10^{-7} cm/s and will provide an excellent impervious lining. Large rock floaters (greater than 4 in. dia.) should not be placed in the embankment fill. Chert fragments less than 4 in. nominal diameter are acceptable in the fill.

3.3 Foundations

The footings can be proportioned using a net allowable bearing capacity of 3,000 psf for continuous wall and isolated footings. Site Classification C should be used for seismic design. During footing excavations, a geotechnical engineer should verify that suitable bearing conditions are present.

Wall footings must be at least 16 in. wide and column footings must be at least 24 in. wide to provide an adequate factor of safety for bearing capacity. All exterior footings and footings in unheated areas must bear at least 30 inches below final exterior grade for frost protection. Interior footings in heated areas can bear at nominal depths below the floor (at least 12 inches).

3.4 Floor Slabs

The geotechnical engineer should inspect the subgrade. Some undercutting and stabilization with crushed stone may be necessary to stabilize the slab area, especially during wet periods of the year.

3.5 Below Grade Walls

Any below grade walls should be designed to provide sufficient drainage to relieve hydrostatic pressure. A clean, free draining granular fill such as KY No. 57 stone should be used to backfill against below grade walls. The backfill zone should be drained using a perforated pipe positioned at the base of the wall. An Equivalent Hydrostatic Pressure (EHP) of 50 pcf may be used to design below grade walls. A unit weight of 130 pcf should be used for the granular backfill. The granular fill should be capped at the ground surface with about 2 ft. of clayey soil to inhibit infiltration of surface water behind the below grade walls. Care should be taken and equipment size limited when compacting next to the walls.

3.6 Pavements

All pavement subgrade surfaces should be uniformly sloped to facilitate drainage and to avoid ponding of water beneath the pavement. Assuming proper subgrade preparation and drainage, a California Bearing Ratio (CBR) value of 2 is recommended.

This value applies for the soil subgrade that is stable under a proofroll inspection, and for soil that is recompacted to 95 percent of the standard Proctor maximum dry density.

In areas that would be limited to automobiles and light trucks, the following asphalt pavement section is recommended.

In areas that would be limited to automobiles and light trucks, the following asphalt pavement section is recommended.

<i>Automobile and Light Truck Areas</i>	1.0 in. asphalt concrete surface
	2.0 in. asphalt concrete base
	8.0 in. KY DGA

Areas that may experience heavier loading conditions should be provided with the following rigid pavement section (concrete).

<i>Heavy Truck Areas</i>	
<i>Rigid Pavement (Concrete)</i>	7.0 in. Concrete
	5.0 in. KY DGA

All paving material should comply with the current Kentucky Department of Highway Specifications. The DGA granular base should be compacted to at least 98 percent of the standard Proctor maximum dry density (ASTM D-698). It should not be expected that the pavement would be maintenance free. However, the required maintenance work should be within normal limits. It is important to note that the asphalt pavement recommendations for automobile parking areas are based on the assumption that these areas will be subject to only automobile and light truck traffic. Where heavy truck traffic is expected, it is recommended that a thicker pavement section be utilized.

4.0 CONSTRUCTION RECOMMENDATIONS

Variations in subsurface conditions must be expected during construction. It is therefore recommended that the geotechnical engineer be retained to review the soils-related phases of the project and to correlate the test boring data with the soil conditions that are encountered during construction.

4.1 Subgrade Preparation

The exposed subgrade should be evaluated by the project geotechnical engineer. The evaluation would include proofrolling of the exposed subgrade with a loaded dump truck or scraper. If unsuitable material is disclosed, an appropriate remedial measure would be recommended by the geotechnical engineer at that time.

The clay soils encountered will be sensitive to moisture and heavy construction equipment, and may require aeration and re-compaction or undercutting to reach firm subgrade. The severity of this potential problem depends to a great extent on the weather conditions prevailing during construction. The contractor should exercise discretion when selecting equipment sizes and also control surface water while the subgrade soils are exposed. It may be necessary to undercut and stabilize the proposed pavement areas with crushed stone especially if the sitework is conducted during wet weather conditions.

4.2 Engineered Fill

Engineered fill should be placed on a prepared subgrade that has been evaluated by the geotechnical engineer. Engineered fill placed in the building areas should be compacted to at least 98 percent of the standard Proctor maximum dry density (ASTM D-698). Fill placed in paved areas may be compacted to 95 percent; and fill placed in landscape (green) areas may be compacted to 90 percent. Engineered fill placement and compaction operations should be monitored by the geotechnical engineer or his representative.

Field density tests should be performed on each lift as necessary to insure that the specified compaction is being achieved. Fill should be placed in horizontal lifts and each lift should be compacted to the specified density. Lift thickness of 8 in. and 12 in. should be used for clayey soils and granular soils, respectively.

4.3 Foundation Excavations

All concrete for foundations should be poured the same day the excavation is made. If this is not practical, the foundation excavation should be adequately protected. Soils exposed in the base of all excavations must be protected against rain and freezing. Surface water should be drained away from all excavations and not allowed to pond.

4.4 Construction Dewatering

No groundwater was encountered during excavation of the test pits. Recommendations for dewatering can be provided during construction if water is encountered.

5.0 QUALIFICATIONS

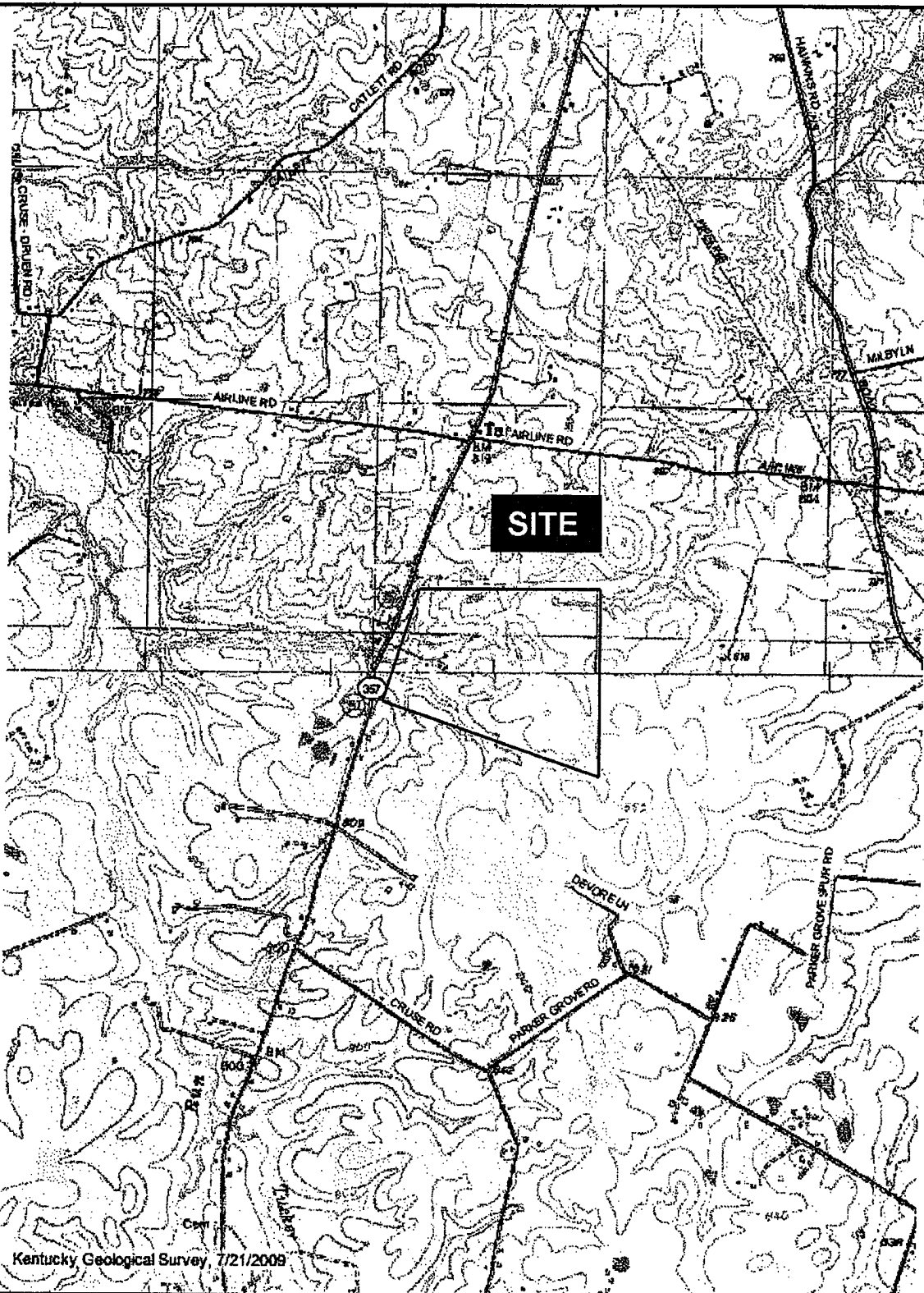
Our professional services have been performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all other warranties, either express or implied. Asher, Inc. is not responsible for the independent conclusion, opinions or recommendations made by others based on the field exploration and laboratory test data presented in this report.

The nature and extent of variation and change in the subsurface conditions at the site may not become evident until the course of construction. Construction monitoring by the geotechnical engineer or his representative is therefore considered necessary to verify the subsurface conditions and to check that the soil connected construction phases are properly carried out. If significant variations or changes are in evidence, it may then be necessary to reevaluate the recommendations of this report.

Furthermore, if the project characteristics are altered significantly from those discussed in this report, if the project information contained in this report is incorrect, or if additional information becomes available, a review must be made to determine if any modification in the recommendations will be required.

APPENDIX

**Site Location Plan
Aerial Photograph
Geologic Map
Location of Test Pits
Test Pit Logs**



Phillips Brothers

ASHER, INC.

Figure 1 - Site Location Plan

Heartland Dairy
Tanner, Kentucky

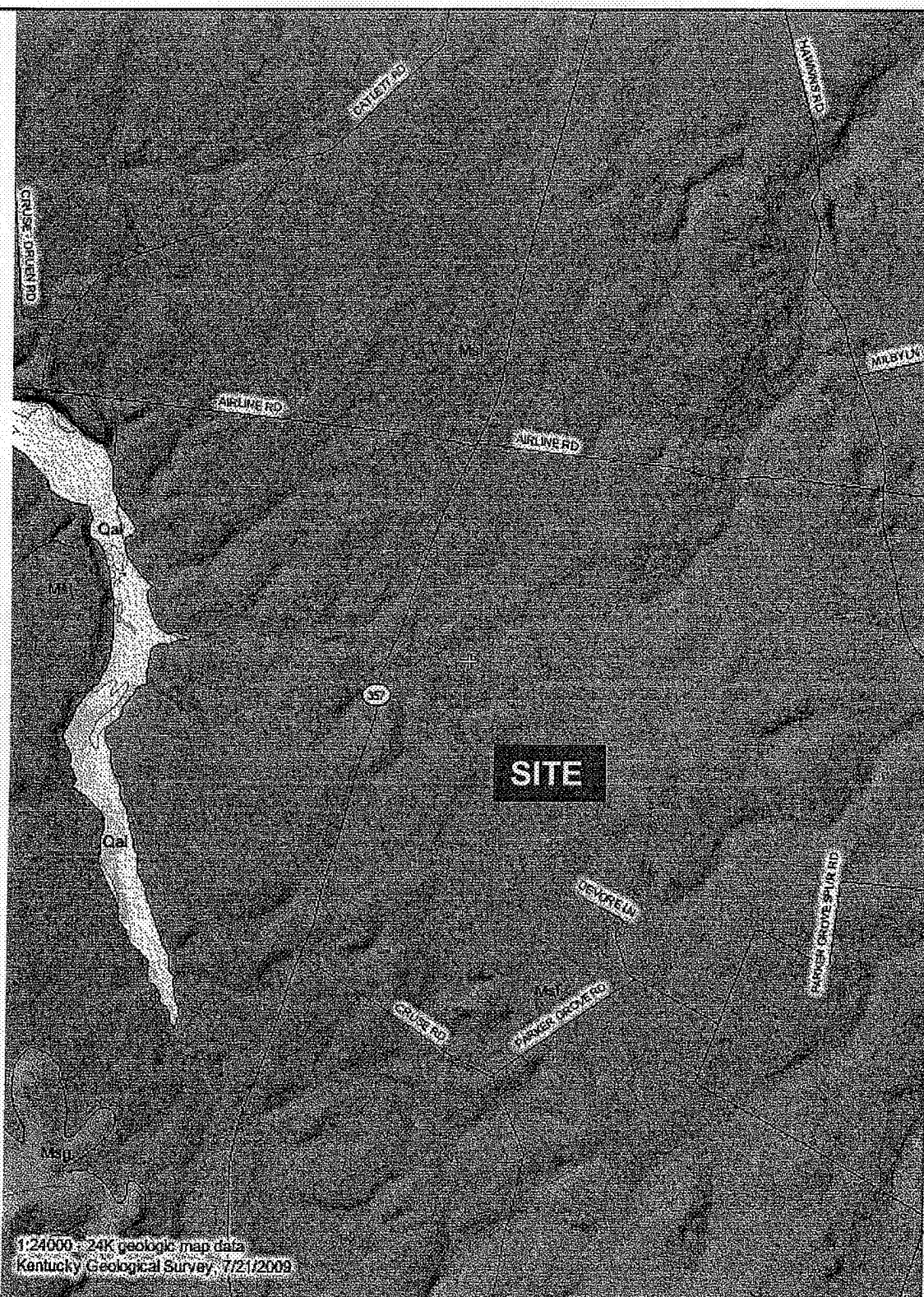
Asher Project Number: 009-100



Phillips Brothers

ASHER, INC.

Figure 2 – Aerial Photo
Heartland Dairy
Tanner, Kentucky
Asher Project Number: 009-100



Phillips Brothers

ASHER, INC.

Figure 3 – Geologic Map

Heartland Dairy
Tanner, Kentucky

Asher Project Number: 009-100

Kentucky Geological Survey Geologic Information Service

Geologic and feature descriptions for visible themes

- [Print This Page](#)

- ID Location Info:

KY Single Zone (north,east): 3705707.52145721, 4911178.85750762

NAD-83 Decimal Degree (lat,lon): 37.500192, -85.784718

State: Kentucky

County: Larue

Quadrangle (tile code): Tonieville (N31)

Elevation: 800, 820, 810

- Legend and descriptions for geologic units in the ID location:

- [Hide Clipped Stratigraphic Column Images](#)
- [Sort Descriptions By Unit](#)
- **Note:** Economic descriptions in this report are historic in nature and may not reflect current conditions

Description Source:

Geologic map of the Tonieville quadrangle, Larue and Hardin Counties, Kentucky

- [view stratigraphic column \(.pdf\) for this quadrangle: GQ-560](#)

Msl

St. Louis Limestone

(Upper Mississippian - Upper Mississippian)

USGS Unit Info: [GEOLEX \(id: 3938\)](#)

Mapped or described as these unit(s) on the original GQ:

St. Louis Limestone (GQ-560):

LOST RIVER CHERT

USGS Unit Info: [GEOLEX \(id: 2544\)](#)

Primary Lithology: Limestone

Limestone, yellowish-gray to light-gray, medium-grained, thick bedded; contains beds of distinctive, highly fossiliferous chert as much as 1 foot thick. Chert is very light gray, weathers to rough reddish blocks that litter the surface in areas of deeply weathered limestone. Top of unit drawn 10 to 20 feet above highest chert float and projected beneath areas covered by slumped sandstone and shale. Ray and others (1946) describe the base of the Ste. Genevieve Limestone as being about 40 feet beneath the top of this unit. Crops out in only one place in north-central part of quadrangle.

ST. LOUIS LIMESTONE

USGS Unit Info: [GEOLEX \(id: 3938\)](#)

Primary Lithology: Limestone, dolomite, and shale

Limestone, dolomite, and shale: Limestone is yellowish gray to olive gray, medium gray, very fine to medium grained, locally dolomitic, argillaceous, or silty; thin to thick bedded; sparsely fossiliferous, including scattered Lithostrotion corals in float; contains numerous zones of nodular or tabular chert; petroliferous odor common. Dolomite is pale yellowish brown, fine to very fine grained, siliceous, very thick bedded. Shale is light olive, calcareous, interbedded with very argillaceous limestone. Darker colored, petroliferous, or argillaceous limestone beds more prevalent in lower half of unit; upper half generally thicker bedded. Normally weathers to a red chert-rich clay soil 30 to 40 feet thick; forms karst topography with few outcrops. Base not exposed. Thickness estimated from drill-hole data.

Soil typically
30 to 40 ft
in thickness

Description Source:

Geologic map of the Hammonville quadrangle, Larue and Hart Counties, Kentucky

- view stratigraphic column (.pdf) for this quadrangle: GQ-1051

Msl

St. Louis Limestone

(Upper Mississippian - Upper Mississippian)

USGS Unit Info: GEOLEX (id: 3938)

Mapped or described as these unit(s) on the original GQ:


STE. GENEVIEVE AND ST. LOUIS LIMESTONES

USGS Unit Info: not available

Primary Lithology: Limestone, dolomite, and shale

Limestone, dolomite, and shale: Limestone, yellowish- to olive- and medium-gray, very fine to medium-grained, locally dolomitic, argillaceous, or silty, sparsely fossiliferous; oolitic near top; numerous zones of nodular or tabular chert. Dolomite pale-yellowish-brown, fine- to very fine grained, siliceous. Shale is light olive, calcareous, interbedded with very argillaceous limestone. This unit is exposed only in one small area along Bacon Creek; lithologic description based on exposures in the Tonieville quadrangle (Moore, 1966).

St. Louis Limestone (GQ-1051):

 image for St. Louis Limestone (GQ-1051) - IF READING THIS ON A NORMAL PAGE DISPLAY, THE IMAGE FOR THIS UNIT IS NOT AVAILABLE

- Lithologic and landform descriptions from SITES in the ID location or area:

- no descriptions from sites found

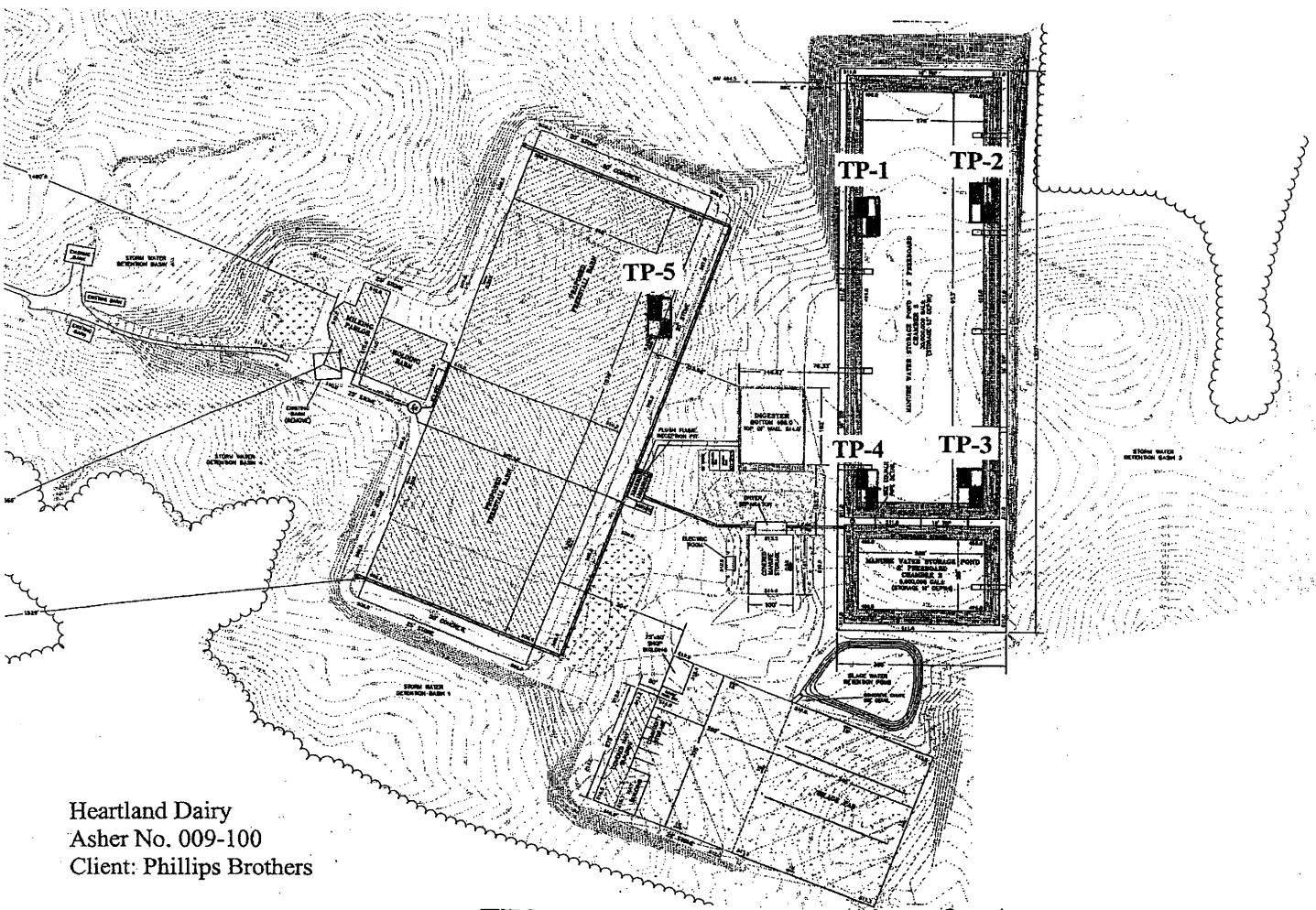
- Database Features:

(these are primarily the "Point overlay" features)

Photo Information:

**no photo found at location

PRINT THIS PAGE



Heartland Dairy
Asher No. 009-100
Client: Phillips Brothers

TEST PIT LOCATION PLAN (FIGURE 4)

DEPTH (FT)	DESCRIPTION	DCP (bpi)	WATER LEVEL
0	TILL ZONE, Topsoil- dark brown, wet		
1.5			
2.0	LEAN CLAY (CL), silty, SOFT to FIRM, brown, wet		
3.0			
4.0	LEAN CLAY (CL), silty, STIFF, orangish brown and gray, moist		
	Moisture Content = 21.1%		Top of Hardpan material, some groundwater seepage observed from silty material directly above the hardpan
5.0	TEST PIT TERMINATED AT 5.0 FT.		
6.0			
8.0			
10.0			
12.0			
14.0			
16.0			
18.0			
20.0			
		TEST PIT RECORD	
REMARKS:		TEST PIT No. TP-1 PROJECT Heartland Dairy PROJECT No. 009-100 DATE July 28, 2009	

DEPTH (FT)	DESCRIPTION	DCP (bpi)	WATER LEVEL
0	TILL ZONE, Topsoil- dark brown, wet		
1.0	LEAN CLAY (CL), silty, FIRM, brown, moist		
2.0	LEAN CLAY (CL), silty, STIFF, orangish brown and gray, moist		
4.0	TEST PIT TERMINATED AT 4.0 FT.		
6.0			
8.0			
10.0			
12.0			
14.0			
16.0			
18.0			
20.0			
TEST PIT RECORD			
REMARKS: No groundwater encountered during excavation of the test pit.		TEST PIT No. TP-2 PROJECT Heartland Dairy PROJECT No. 009-100 DATE July 28, 2009	

DEPTH (FT)	DESCRIPTION	DCP (bpi)	WATER LEVEL
0	TILL ZONE, Topsoil- dark brown, moist		
1.5			
2.0	LEAN CLAY (CL), silty, STIFF, orangish brown and gray, moist		
4.0	TEST PIT TERMINATED AT 4.0 FT.		
6.0			
8.0			
10.0			
12.0			
14.0			
16.0			
18.0			
20.0			
TEST PIT RECORD			
REMARKS: No groundwater encountered during excavation of the test pit.		TEST PIT No. TP-3 PROJECT Heartland Dairy PROJECT No. 009-100 DATE July 28, 2009	

DEPTH (FT)	DESCRIPTION	DCP (bpi)	WATER LEVEL
0	TILL ZONE, Topsoil- dark brown, moist		
1.5			
2.0	LEAN CLAY (CL), silty, STIFF, orangish brown and gray, moist		
4.0	TEST PIT TERMINATED AT 4.0 FT.		
6.0			
8.0			
10.0			
12.0			
14.0			
16.0			
18.0			
20.0			
TEST PIT RECORD			
REMARKS: No groundwater encountered during excavation of the test pit.		TEST PIT No. TP-4 PROJECT Heartland Dairy PROJECT No. 009-100 DATE July 28, 2009	

DEPTH (FT)	DESCRIPTION	DCP (bpl)	WATER LEVEL
0	TILL ZONE, Topsoil- dark brown, moist		
1.0	LEAN CLAY (CL), silty, FIRM, brown, moist		
2.0			
4.0	FAT CLAY (CH), some silt, STIFF, reddish brown, gray, w/ some orangish brown mottling, moist		Moisture Content = 26.6%
6.0			
8.0	FAT CLAY (CH), STIFF to VERY STIFF, reddish brown, moist		Moisture Content = 23.6%
10.0			
12.0	TEST PIT TERMINATED AT 12.0 FT.		
14.0			
16.0			
18.0			
20.0			
TEST PIT RECORD			
REMARKS: No groundwater encountered during excavation of the test pit.		TEST PIT No. TP-5 PROJECT Heartland Dairy PROJECT No. 009-100 DATE July 28, 2009	

